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(54) **Forced-convection cooking oven**

(57) A fan-assisted oven includes a cooking chamber, an underlying heat source, a partition which separates the source from the cooking chamber, a front door, a vertical rear wall, and a fan positioned approximately in the centre of the vertical wall and drawing air from the chamber, characterised in that the fan is connected to the chamber by an aperture (3) formed in the rear wall in correspondence with the upper intake region of the fan and by a substantially flat, vertical duct (5) connected at its upper end to the lower intake region of the fan and at its lower end, through a plurality of apertures (7), to the lower region of the chamber corresponding to the corner between the bottom of the chamber and the rear wall.

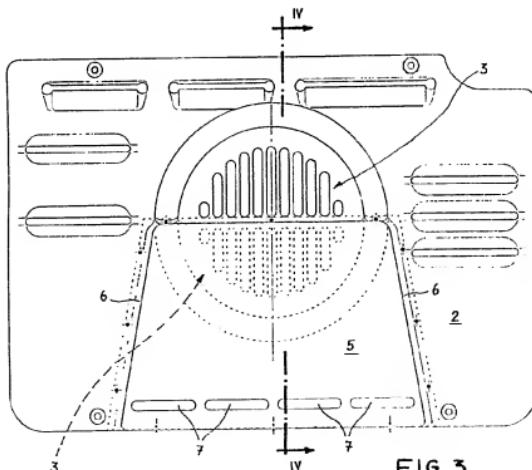


FIG. 3

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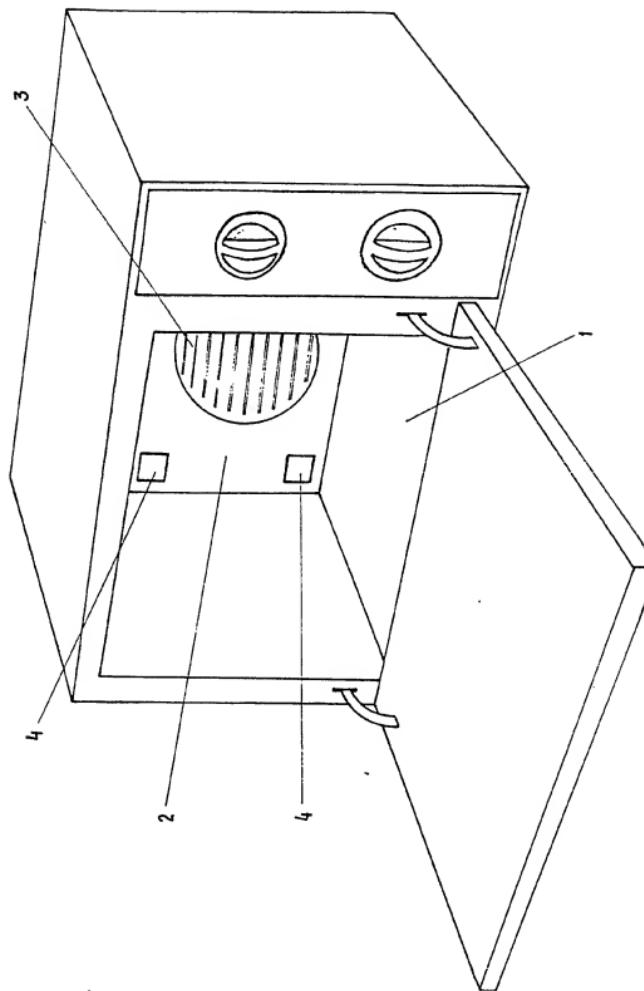


FIG. 1

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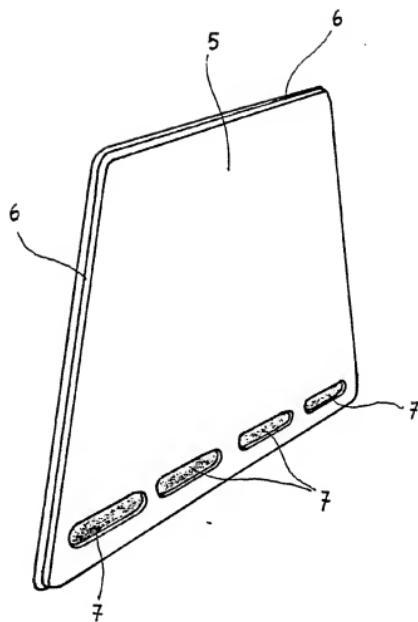


FIG. 2

FIG. 4

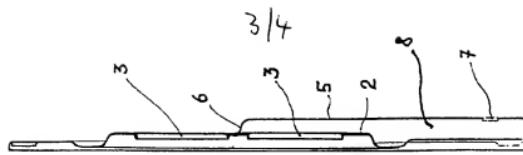
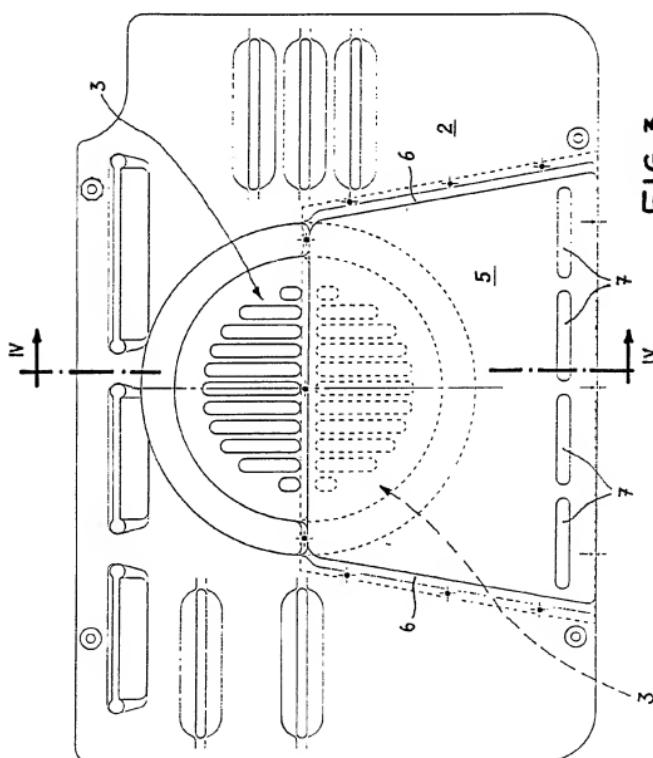


FIG. 3



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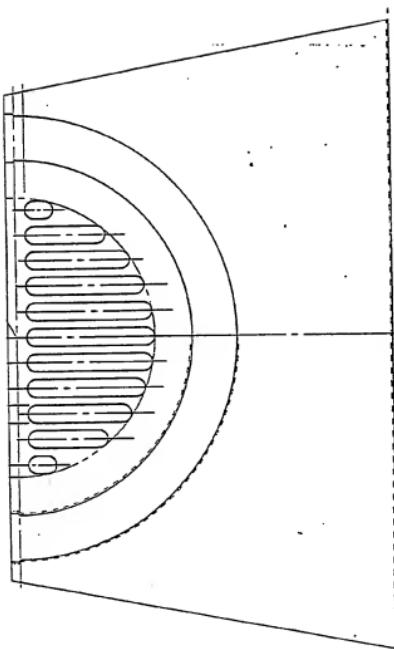


FIG. 5

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A DEVICE FOR DRAWING AIR FROM THE LOWER REGION  
OF THE CAVITY OF A FAN-ASSISTED OVEN

The present invention relates to a device for directing air within the cavity of a fan-assisted oven.

As is known, ovens, particularly domestic ovens, can be divided into two main categories: ovens without fans and fan-assisted ovens.

An oven without a fan has a heat source (a gas burner or electrical resistances) in a heating chamber normally formed at the bottom of the oven and separated from the overlying cooking chamber proper by a flat, horizontal, sheet-metal partition which is often removable.

The heat is transmitted from the heating chamber to the cooking chamber in two ways, by natural convection and by conduction, as described below:

By natural convection: several quite large holes are formed in the sheet-metal partition separating the two chambers and the air heated in the underlying heating chamber passes through these spontaneously into the overlying cooking chamber, as a result of the lower density of the hot air (or possibly of the gas and air mixture).

By conduction: the undersurface of the partition, which is in almost direct contact with the heat source, is heated and this heat is automatically transmitted to its upper surface which in turn heats the air passing over it within the cooking chamber.

Fan-assisted ovens, whose basic characteristics and advantages are familiar and will therefore be considered as known, are constructed in a manner

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substantially similar to that just described but have some further characteristics.

In fact, the hot air is circulated in the cavity not only by spontaneous movements and phenomena resulting from its heat-transmission properties, but also by a fan which is normally situated in the vertical rear wall.

The fan is normally connected to the heating chamber by means of ducts and faces the cooking chamber directly (normally through oil-retaining filters) and is also connected to the cooking chamber by means of ducts which branch from its peripheral region and lead to large outlet holes formed at various points in the wall.

In this type of structural solution, the functioning of the oven is quite clear; the fan draws in air from both the heating chamber and the central region of the oven and forces it back into the cooking chamber through the ducts and holes in the aforesaid vertical wall, achieving the desired circulation of air.

However, the type of oven just described has the following problem: because the air is drawn substantially from the centre of the chamber, that is, from a region situated at an intermediate height in the chamber, and because, on the other hand, most of the heat admitted to the oven is transmitted to the bottom partition, the obvious result is that the heat is not distributed uniformly throughout the height of the chamber and the introduction of forced ventilation in an attempt to remedy the known disadvantages in performance is therefore only partially successful

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since, although they are reduced, the disadvantages persist.

The object of the present invention is to provide a reliable, cheap and simple device which can modify the behaviour of the air flow into and out of the cavity so as further to improve the overall temperature distribution in the cavity.

In fact, the invention relates to a device for interrupting and directing the flow of air, which partially obstructs the intake of the fan from the cooking cavity and provides replacement intake ducts with intake openings in the immediate vicinity of the flat, horizontal partition at the bottom of the oven.

The object of the invention is achieved by the device which is defined in the claims concluding the patent specification, and which substantially modifies the behaviour of the air flows drawn from the cooking cavity by the fan and consequently modifies the temperature distribution in the oven.

The characteristics of the invention will become clearer from the following description, given purely by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1 shows the inside of a fan-assisted oven according to the prior art;

Figure 2 shows an embodiment of the device according to the present invention;

Figures 3 and 4 are a front view and a longitudinal

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section respectively of the vertical wall of the fan modified by the fitting of the device of the present invention;

Figure 5 shows an internal sector for fitting to the main wall.

Figure 1 shows the interior of a fan-assisted oven with its bottom partition 1, its vertical rear wall 2, the central aperture 3 in the latter for the drawing of air from the cavity by the fan, and the holes 4 for the return of the air to the cavity by the fan (only 2 holes are visible in Figure 1).

Figure 2 is a perspective view of one embodiment of the device according to the invention. The device is shaped like a regular trapezium and is constituted by a frontal covering part 5 and a lateral sealing part 6 which extends along the top and sides of the central part like a rim perpendicular to the latter.

The lower region of the front part 5 has a series of substantially horizontal apertures 7 which extend across the entire width of its lower edge.

The length of the top edge of the trapezium is approximately the same as the diameter of the aperture in the fan wall, the bottom edge of the trapezium is a little shorter than the width of the oven, and the distance between these two edges is more or less equal to the height of the centre of the fan aperture above the bottom of the oven.

The device is fitted to the vertical fan wall as shown in Figures 3 and 4.

An intake space 8 is thus formed between the frontal wall 5, the rear wall 2 and the lateral sealing part 6 at the sides and the top.

The device operates as follows:

after the fitting of the device and as a consequence thereof, approximately the bottom half of the intake aperture 3 is obstructed by the space thus created. The fan no longer draws completely from the aperture 3 but draws simultaneously, albeit to a lesser extent, from the numerous holes 7.

The heated air close to the bottom partition is thus drawn in with greater force, given that the distribution of the intake flows achieved is at an optimum for the lower region in particular.

Obviously, the heated air drawn in is then mixed by the fan and sent back into the chamber solely through the holes 4.

As a result of this dual air circulation, most of the heated air in the lower region is drawn in before it reaches the substances being cooked and is then sent back to the colder region at the top of the oven; the final result of these two effects is very even oven temperature achieved by simple, cheap and reliable means without significant modification of the original structure of the oven.

Obviously, the scope of the invention includes all the many variants which an expert in the art could devise. Attention is drawn particularly to a variant which is especially cheap to produce.

In this variant, the device of the present invention and the vertical wall 2 of the oven are constituted by one appropriately-shaped part produced by the assembly of two components. In particular Figure 5 shows the internal sector which must be fitted to the rear wall 2 to form the duct 8.

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CLAIMS

1. A fan-assisted oven including a cooking chamber, an underlying heat source, a partition (1) which separates the source from the cooking chamber, a front door, a vertical rear wall, and a circular fan (3) positioned approximately in the centre of the vertical wall and drawing air from the chamber, characterised in that the fan is connected to the chamber by an aperture formed in the rear wall in correspondence with the upper intake region of the fan and by a substantially flat, vertical duct (8) connected at its upper end to the lower intake region of the fan and at its lower end, through a plurality of apertures (7), to the lower region of the oven corresponding to the corner between the bottom of the oven and the rear wall.
2. An oven according to Claim 1, characterised in that the duct (8) which connects the fan to the lower region of the oven is formed integrally with the vertical rear wall of the oven by the suitable forming and working of the wall and the subsequent welding of the part shown in Figure 5.
3. An oven according to the preceding claim, substantially as identified in the appended drawings.